

*Think not lightly of good, saying,  
"It will not come to me."  
Drop by drop is the water pot filled.*

*Likewise, the wise one,  
gathering it little by little,  
fills oneself with good.*

*Dhammapada 9.122*

# ***Neurodharma:***

## **Buddhist Practice with the Brain in Mind**

**Community Dharma Leaders  
Barre Center for Buddhist Studies  
July, 2015**

**Rick Hanson, Ph.D.  
[www.RickHanson.net](http://www.RickHanson.net)**

**Wellspring Institute for Neuroscience and Contemplative Wisdom**

# Foundations

---

**Coming into presence in this moment  
as it is. Letting go while abiding as  
mind as a whole.**

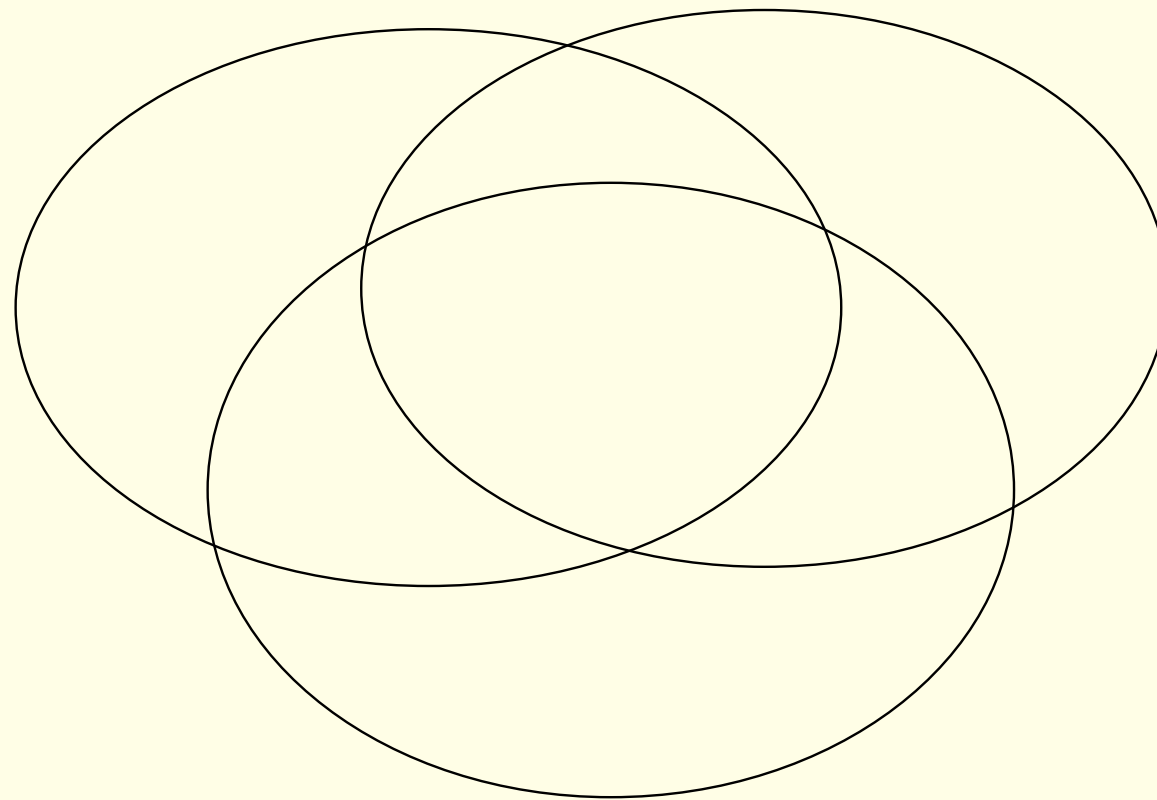
**Abiding as mind as a whole, also  
opening into a growing sense of:**

- **Peace**
- **Contentment**
- **Love**

# Common - and Fertile - Ground

***Neuroscience***

***Psychology***



***Contemplative Practice***

*We ask, “What is a thought?”*

*We don't know,*

*yet we are thinking continually.*

**Venerable Tenzin Palmo**

# **Mental Resources**

# What Shapes the Course of a Life?

---

**Challenges**

**Vulnerabilities**

**Resources**



# Where Are Resources to Be Found?

---

**World**

**Body**

**Mind**

# Major Buddhist Mental Resources

---

<b>Mindfulness</b>	<b>Compassion</b>	<b>View</b>
<b>Investigation</b>	<b>Kindness</b>	<b>Intention</b>
<b>Energy</b>	<b>Altruistic joy</b>	<b>Effort</b>
<b>Bliss</b>		
<b>Tranquility</b>	<b>Virtue</b>	<b>Conviction</b>
<b>Concentration</b>	<b>Wisdom</b>	<b>Generosity</b>
<b>Equanimity</b>		<b>Patience</b>

# MENTAL RESOURCES ARE BUILT FROM BRAIN STRUCTURE



# Two wolves in the heart



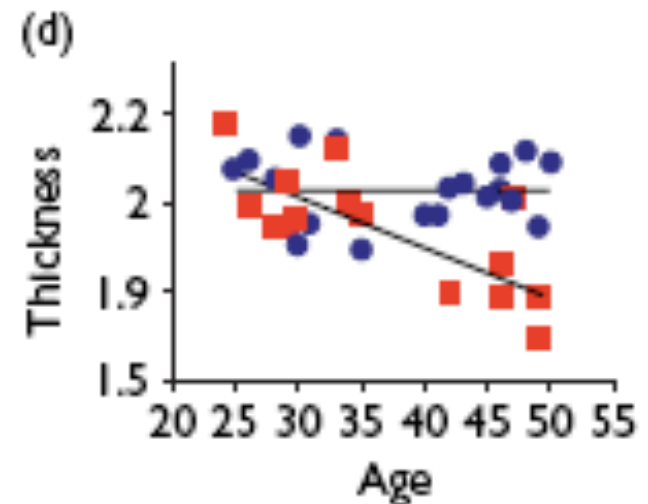
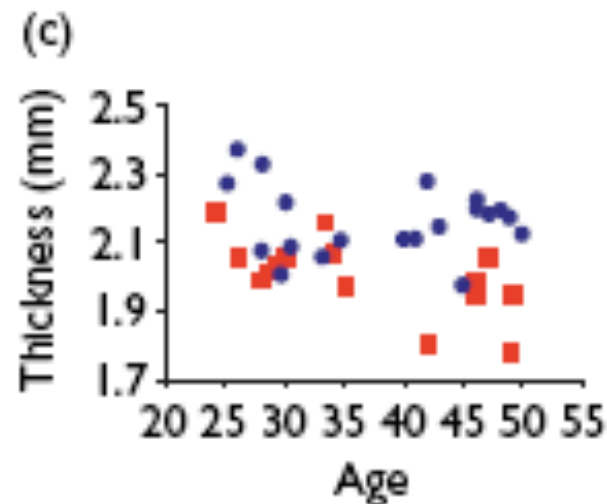
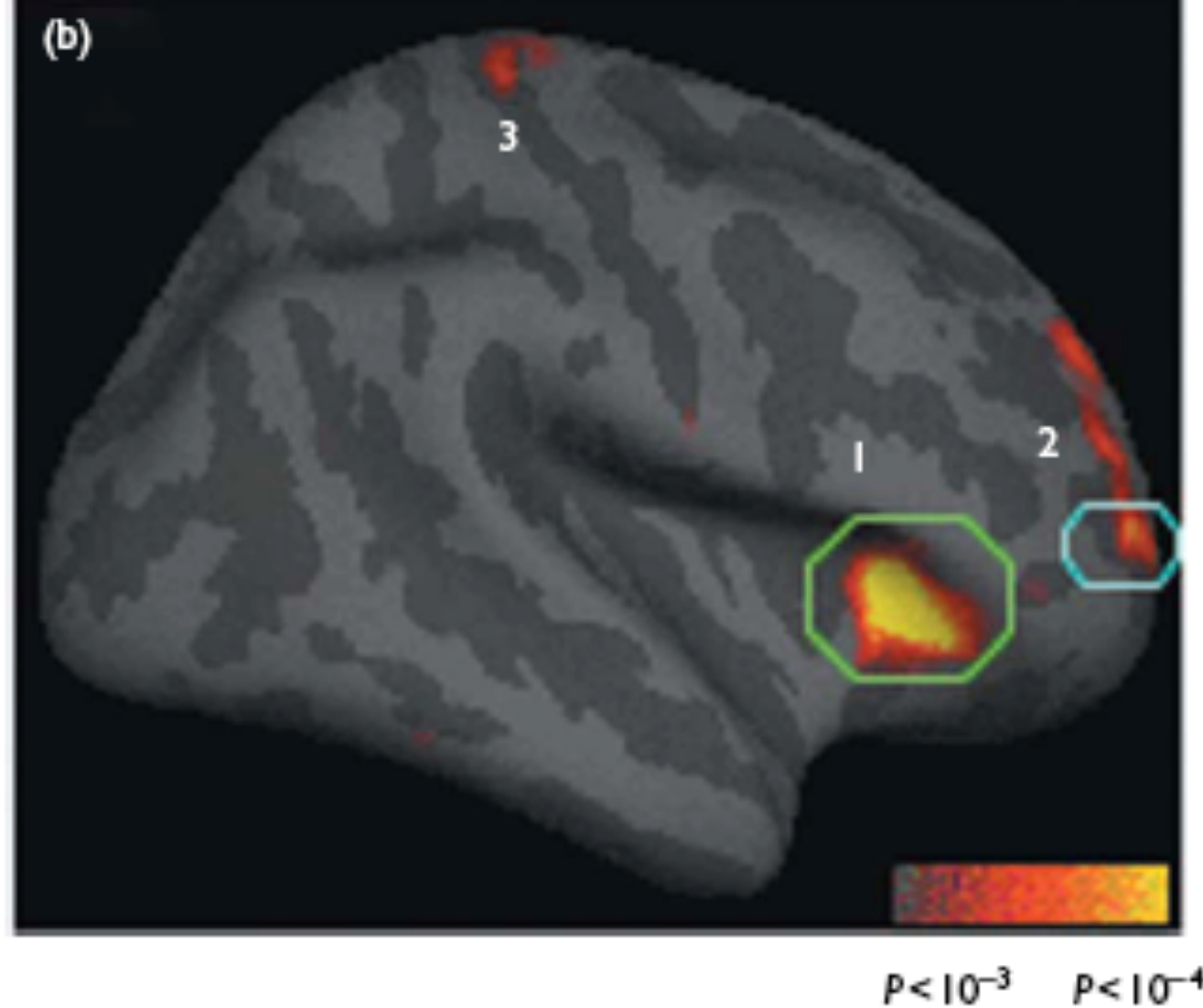


A complex network of glowing yellow-orange neurons is shown against a dark background. The neurons consist of cell bodies (soma) and long, thin, branching processes (dendrites and axons) that interweave to form a dense web. One neuron in the center is highlighted with a bright green nucleus and a green glow, making it stand out from the others.

Neurons that fire together,

wire together.

Lazar, et al. 2005.  
Meditation  
experience is  
associated  
with increased  
cortical thickness.  
*Neuroreport*, 16,  
1893-1897.





**We can use the mind**

**To change the brain**

**To change the mind for the better**

**To benefit ourselves and other beings.**

# In the Garden of the Mind

---

1. Be with what is there.
2. Decrease what's harmful.
3. Increase what's beneficial.

Witness. Pull weeds. Plant flowers.  
Let be. Let go. Let in.

Mindfulness is present in all three.

“Being with” is primary – but not enough.  
We also need “wise effort.”





# SPIRIT ROCK MEDITATION CENTRE



Join us for

**Cultivating Inner Strength - Monastic  
Daylong [Dana - No Fee Day]**

with Ayya Anandabodhi  
and Ayya Santacitta  
on

**Sunday, July 8**

from 9:30 am - 5 pm.

(Photo by Ed Ritger)

# Let's Try It

---

- **Notice** that you are basically alright right now.
  - Have the experience.
  - Enrich it.
  - Absorb it.
- **Create** the experience of compassion.
  - Have the experience.
  - Enrich it.
  - Absorb it.

# Neurobhavana

# The Neuropsychology of Learning

---

**Learning – changing neural structure and function – has two stages:**

**From short-term memory buffers to long-term storage**

**From state to trait**

**From activation to installation.**

**Inner strengths are grown from  
experiences of them – activated  
states – that are installed as traits.**

---

**You become more compassionate  
by installing experiences of compassion.**

**You become more grateful  
by installing experiences of gratitude.**


**You become more mindful  
by installing experiences of mindfulness.**

**Most experiences of inner strengths  
are enjoyable.**

**They feel good because they are good  
for us and others.**

**Without installation,  
there is no learning,  
no change in the brain.**





**We're good at activation  
but bad at installation.**

**This is the fundamental weakness in  
most patient education, human  
resources training, psychotherapy,  
coaching, and mindfulness training.**

*The same research that proves therapy works  
shows no improvement in outcomes  
over the last 30 or so years.*

**Scott Miller**


**Meanwhile,  
painful, harmful experiences  
are being rapidly converted  
into neural structure.**

# Velcro for Bad, Teflon for Good

The negativity bias

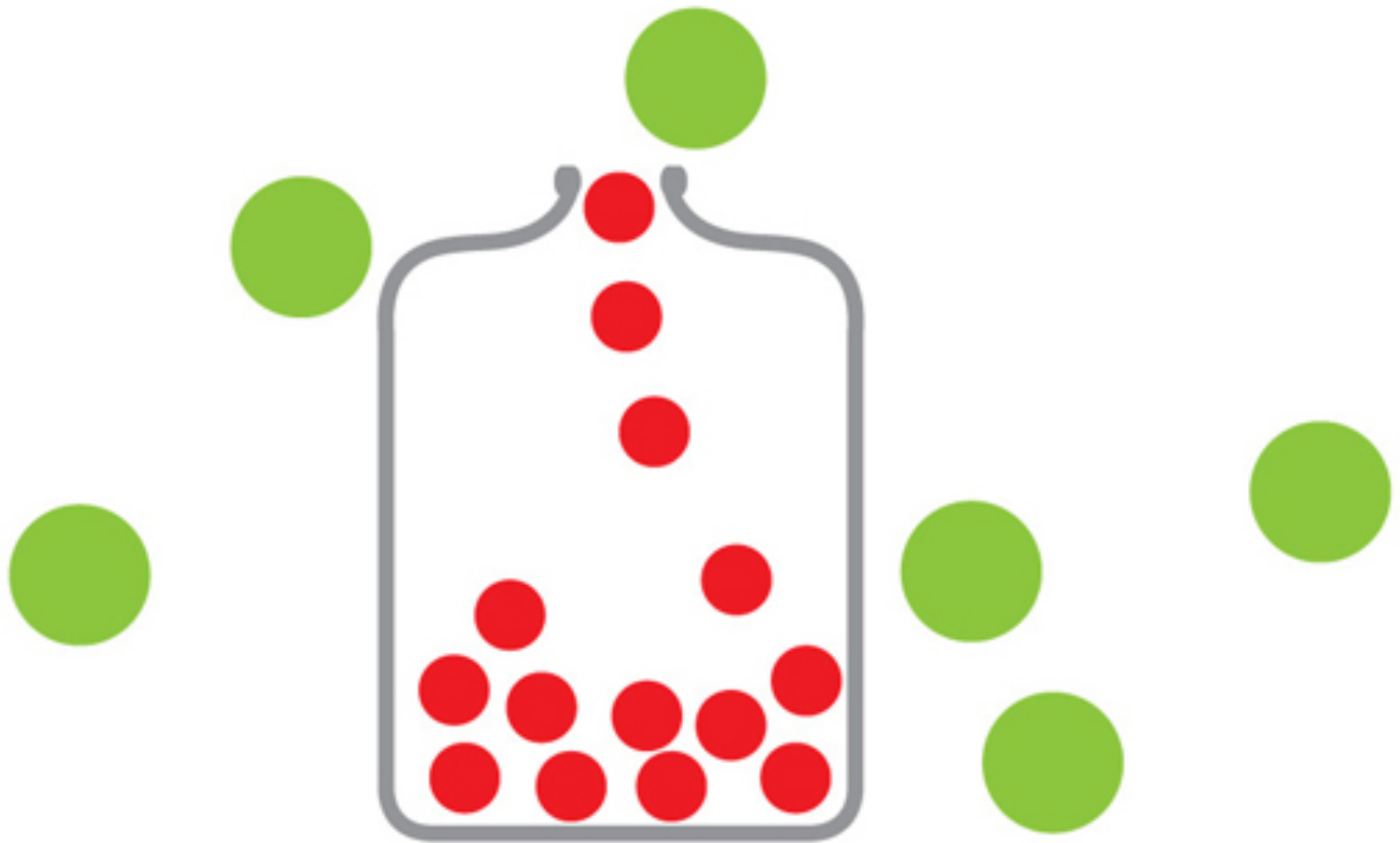
bad experiences

good experiences



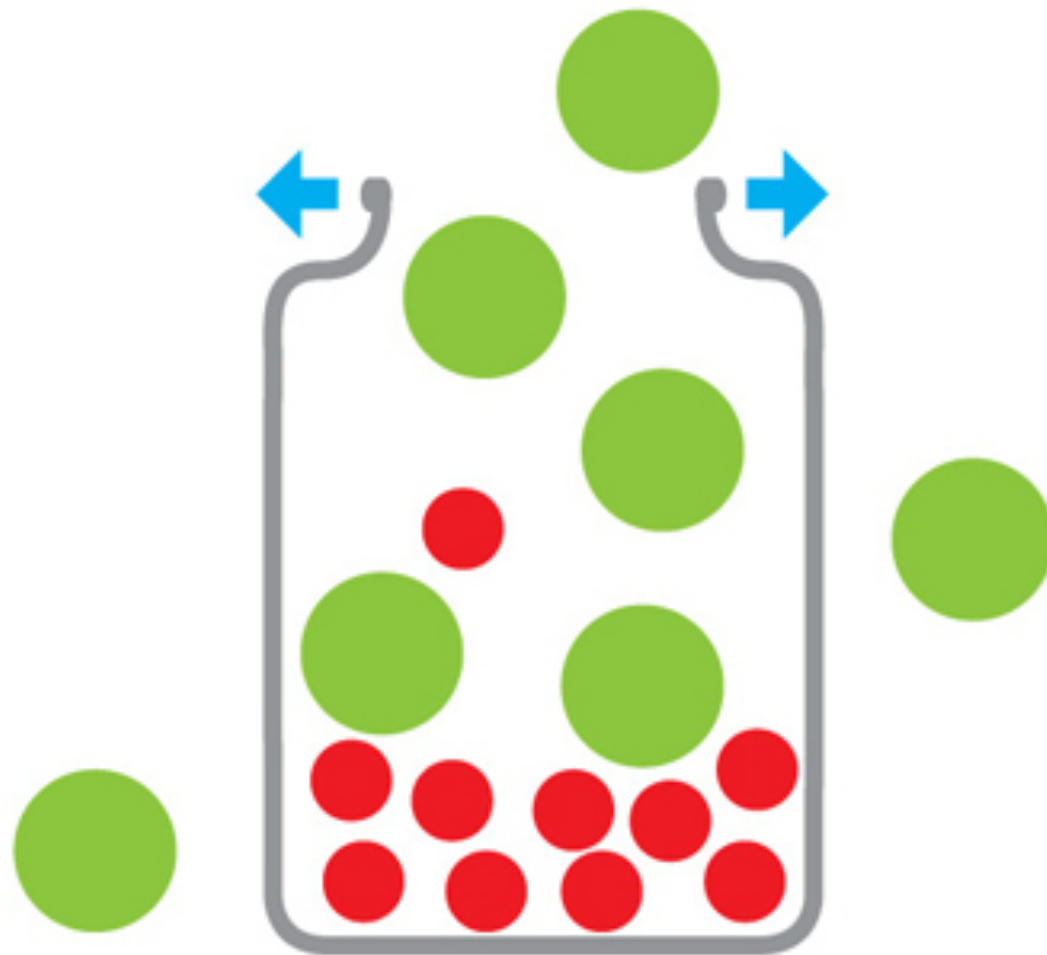
**The brain is good  
at learning from  
bad experiences  
but bad at learning from good ones.**

**Even though learning from  
good experiences  
is the primary way  
to grow resources for well-being.**



## The Negativity Bias

# **Taking in the Good**



**Learning to Take in the Good**



**Pick a partner and choose an A and a B (A's go first). Then you'll take turns, with one partner mainly speaking while the other person listens, exploring this question:**

**What are some of the good facts in your life these days?**

**Move around the room, interacting briefly with others, one person at a time.**

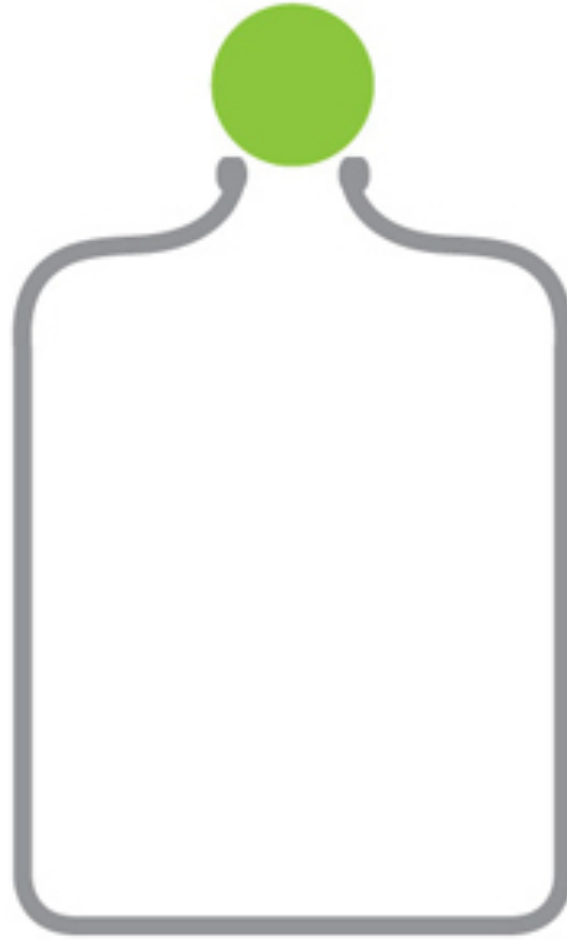
**One person says: “A good fact in my life these days is X.”**

**The other person says: “I’m glad for you.”**

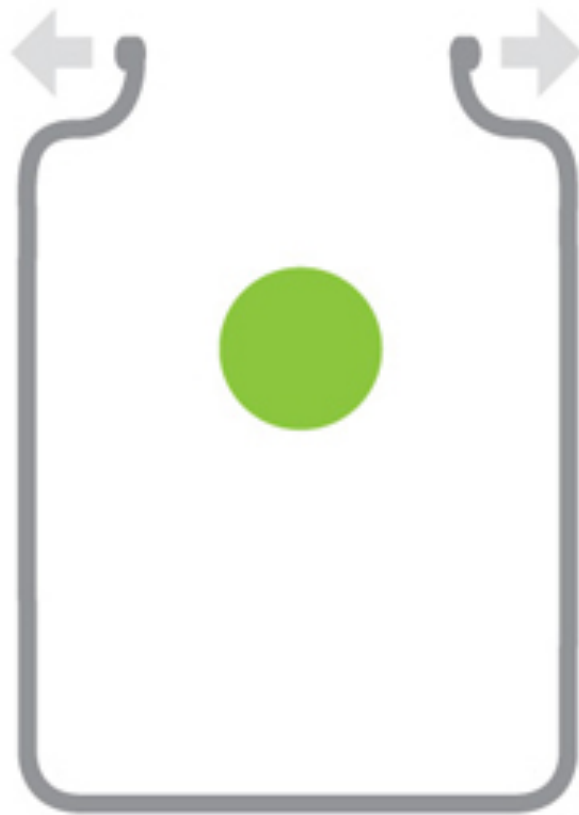
**Then switch roles.**

**Then find another person and do it again.**

**→ Keep it real. And take it in.**



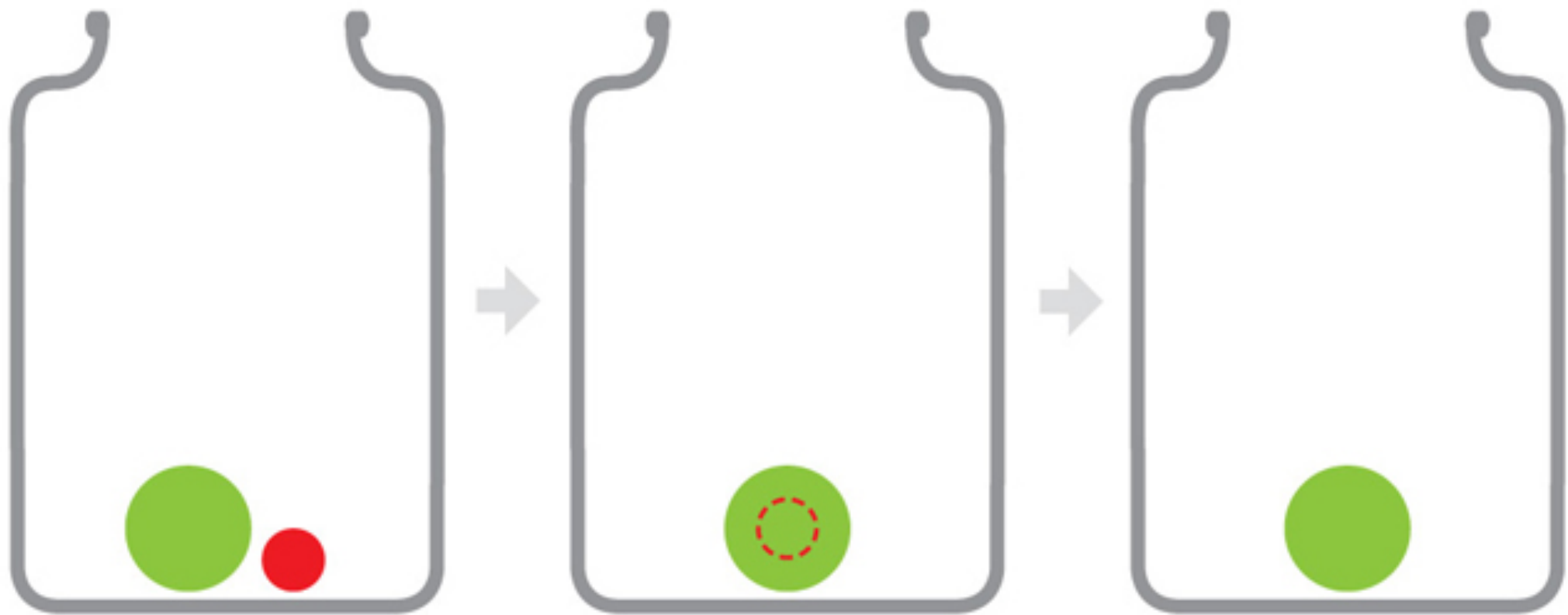
**Have a Good Experience**



**Enrich It**



**A**bsorb It



**Link Positive and Negative Material**

# HEAL Yourself

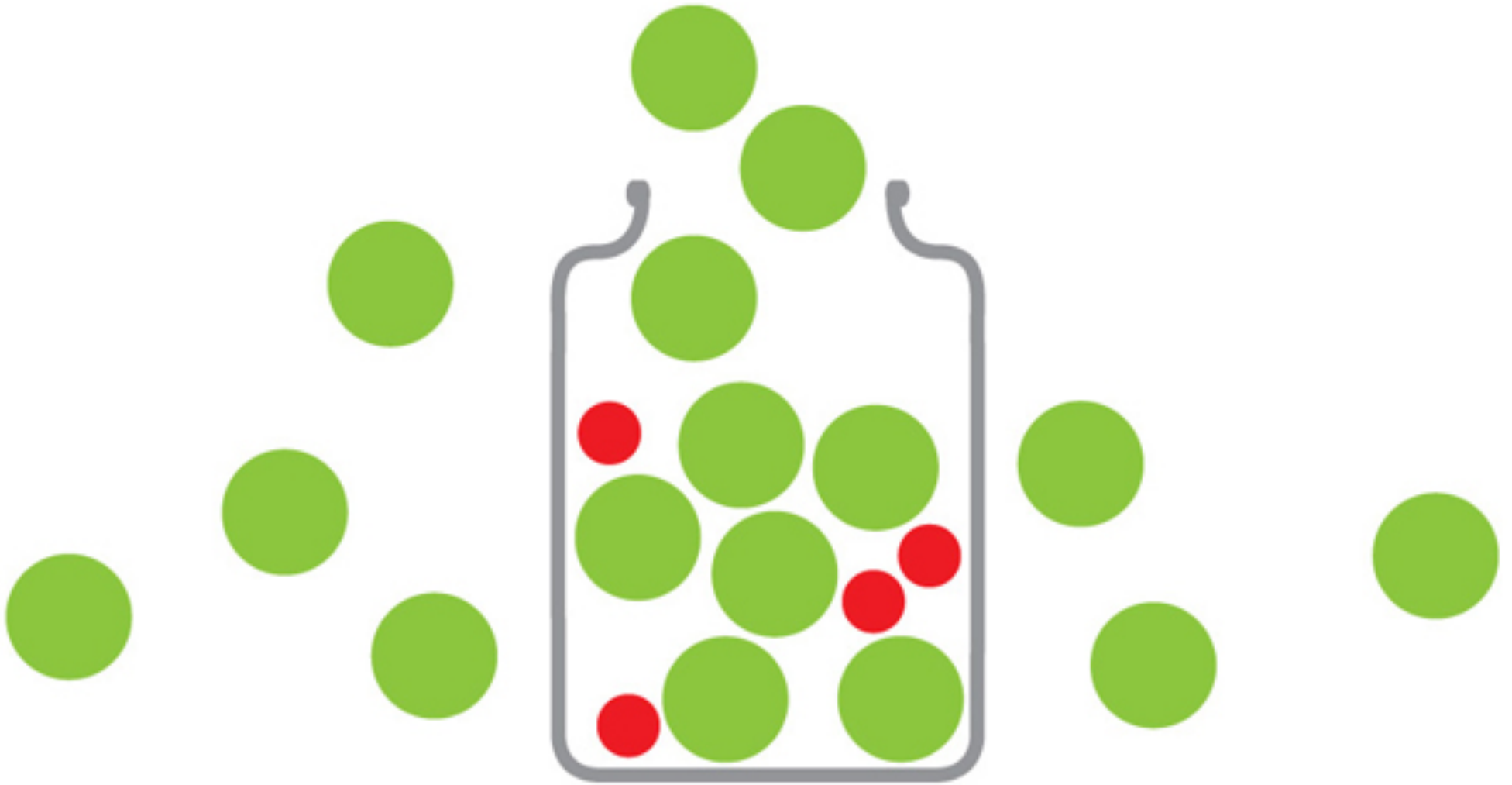
---

**H**ave a positive experience.

**E**nrich it.

**A**bsorb it.

**L**ink positive and negative material.



**Have It, Enjoy It**





*Know the mind.*

*Shape the mind.*

*Free the mind.*

# **Steadying the Mind**

# Factors of Concentration

---

- Setting an intention
- Relaxing the body
- Feeling cared about
- Feeling safer
- Encouraging positive emotion
- Absorbing the benefits

# **Lateral Networks of Spacious Awareness**

# Dual Modes

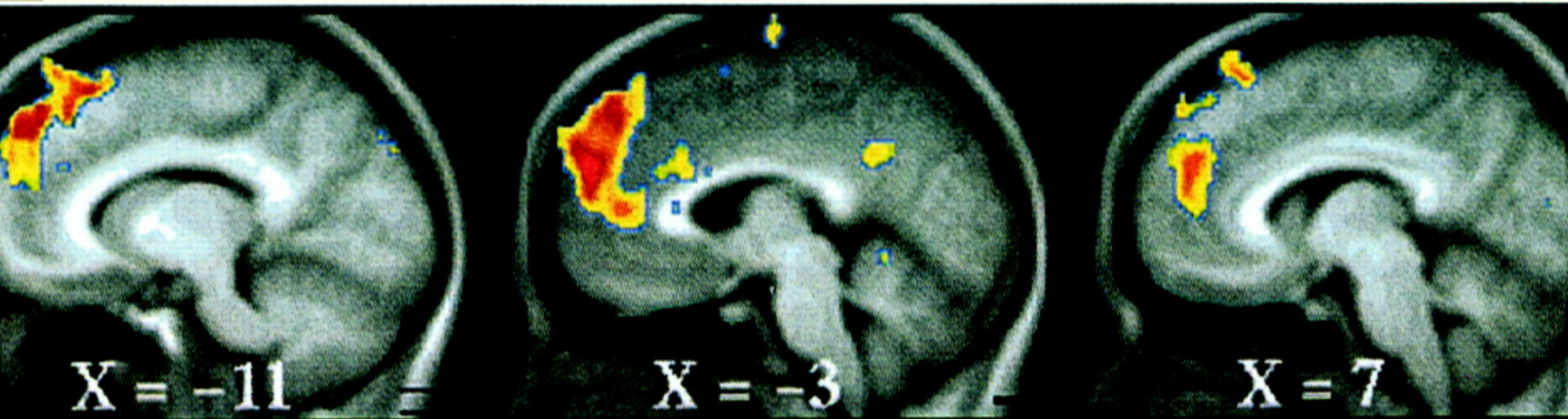
## “Doing”

Focused attention  
Goal-directed  
Sense of craving  
Personal, self-oriented perspective  
Lost in thought, mind wandering  
Conceptual  
Future- or past-focused  
Much verbal activity  
Firm beliefs  
Evaluative  
Looping contents of mind  
Tightly connected experiences  
Focal view  
Prominent self-as-object  
Prominent self-as-subject

## “Being”

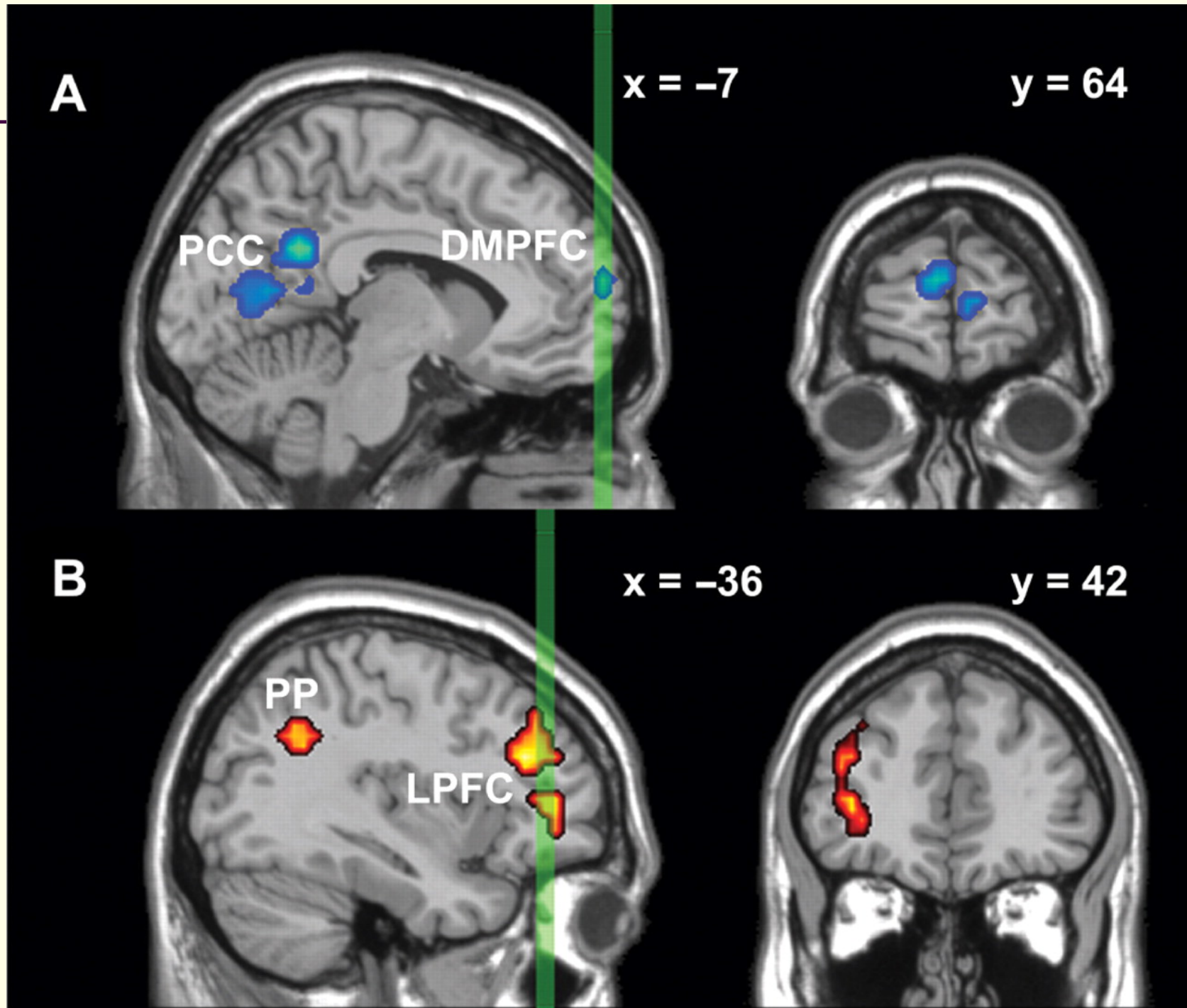
Open awareness  
Nothing to do, nowhere to go  
Sense of peace  
Impersonal, 3<sup>rd</sup> person perspective  
Mindful presence  
Sensory  
Now-focused  
Little verbal activity  
Uncertainty, not-knowing  
Nonjudgmental  
Transient contents of mind  
Loosely connected experiences  
Panoramic view  
Minimal or no self-as-object  
Minimal or no self-as-subject

# Increased Medial PFC Activation Related to Self-Referencing Thought



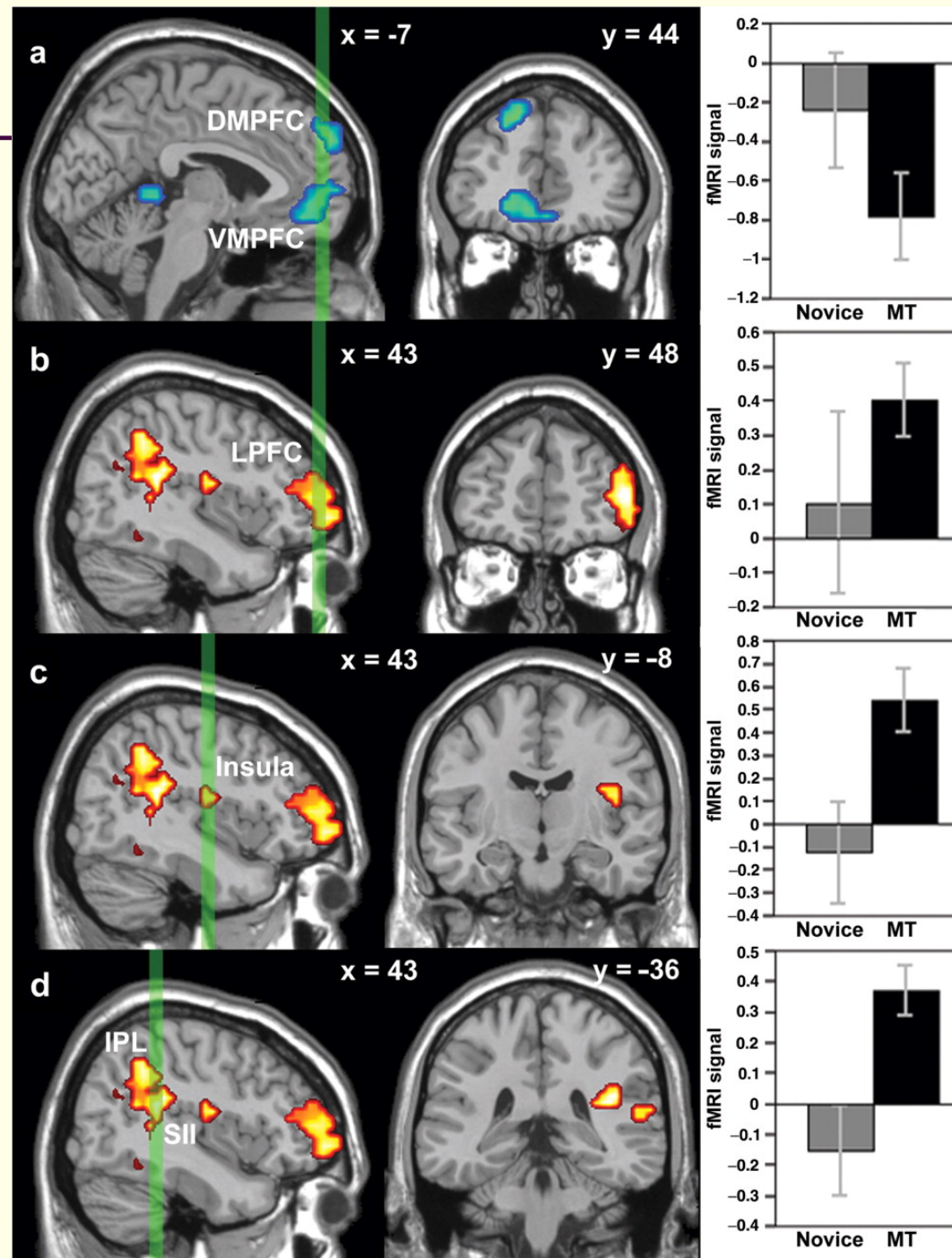
Gusnard D. A., et.al. 2001. *PNAS*, 98:4259-4264

# Self-Focused (blue) and Open Awareness (red) Conditions (in the novice, pre MT group)





# Self-Focused (blue) and Open Awareness (red) Conditions (following 8 weeks of MT)





# Dual Modes

## “Doing”

Focused attention  
Goal-directed  
Sense of craving  
Personal, self-oriented perspective  
Lost in thought, mind wandering  
Conceptual  
Future- or past-focused  
Much verbal activity  
Firm beliefs  
Evaluative  
Looping contents of mind  
Tightly connected experiences  
Focal view  
Prominent self-as-object  
Prominent self-as-subject

## “Being”

Open awareness  
Nothing to do, nowhere to go  
Sense of peace  
Impersonal, 3<sup>rd</sup> person perspective  
Mindful presence  
Sensory  
Now-focused  
Little verbal activity  
Uncertainty, not-knowing  
Nonjudgmental  
Transient contents of mind  
Loosely connected experiences  
Panoramic view  
Minimal or no self-as-object  
Minimal or no self-as-subject

# Ways to Activate Being Mode

---

- Relax.
- Focus on bare sensations and perceptions.
- Sense the body as a whole.
- Take a panoramic, “bird’s-eye” view.
- Engage “don’t-know mind”; release judgments.
- Don’t try to connect mental contents together.
- Let experience flow, staying here now.
- Relax the sense of “I, me, and mine.”

# Whole Body Awareness

---

- Sense the breath in one area (e.g., chest, upper lip)
- Sense the breath as a whole: one gestalt, percept
- Sense the body as a whole, a whole body breathing
- Sense experience as a whole: sensations, sounds, thoughts . . . all arising together as one unified thing
- This sense of the whole may be present for a second or two, then crumble; just open up to it again.

# **The Buddha's Drive Theory of Suffering**

# A Telling of the Four Noble Truths

---

**There is suffering.**

**When craving arises, so does suffering.**

**When craving passes away, so does suffering.**

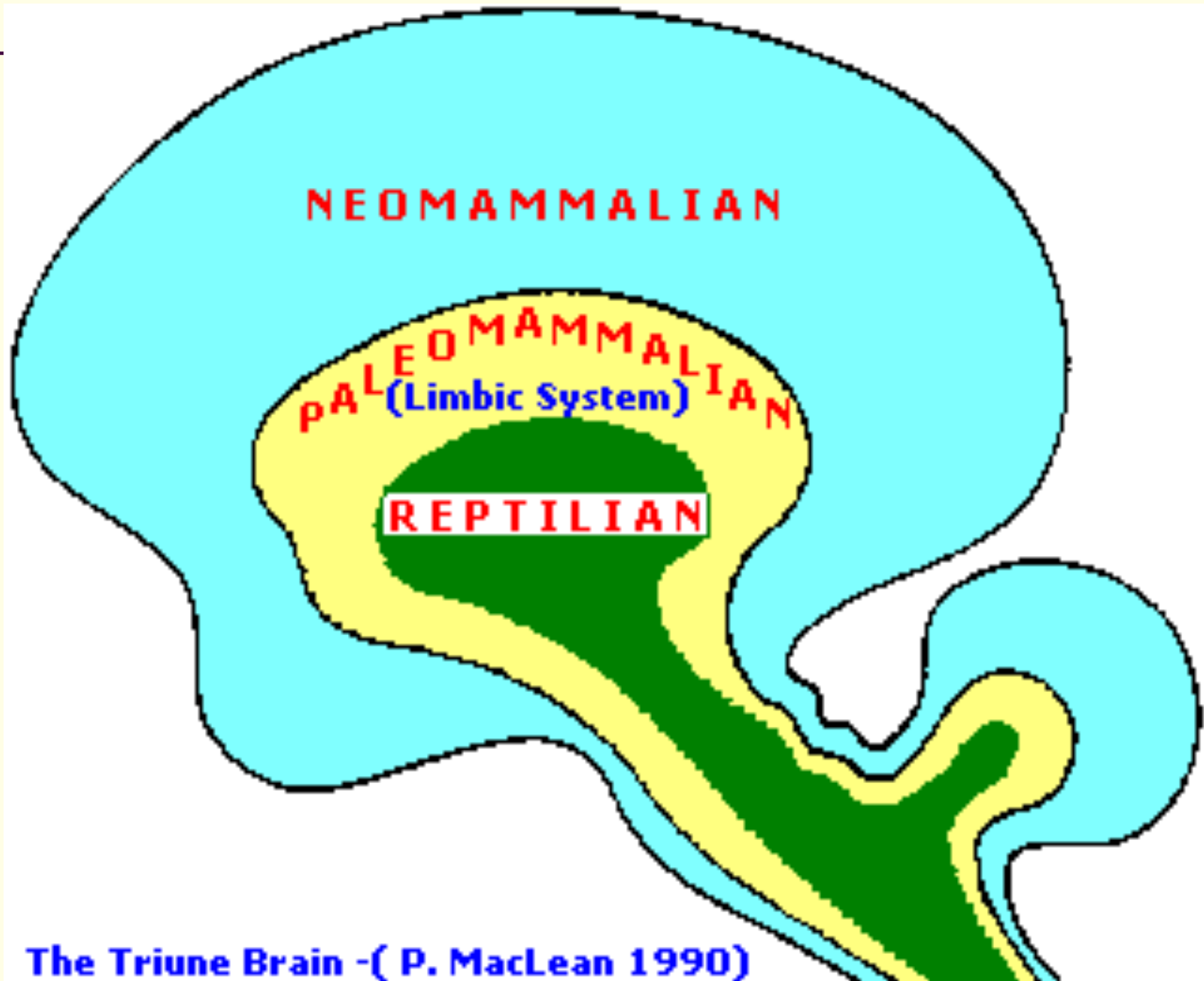
**There is a path that embodies and leads to the passing away of this craving and suffering.**



**What causes craving?**

**What ends these causes?**

# The Evolving Brain



The Triune Brain - ( P. MacLean 1990)

# Meeting Three Core Needs

---

## Need

## Signal

## Strategy

**Safety**

**Unpleasant**

**Avoiding**

**Satisfaction**

**Pleasant**

**Approaching**

**Connection**

**Heartfelt**

**Attaching**



# Craving Arising . . .

---

*When there is a presumed or felt deficit or disturbance of safety, satisfaction, or connection*

The body fires up into the stress response; outputs exceed inputs; long-term building is deferred.

The mind fires up into:

- **Fear** (Avoiding)
- **Frustration** (Approaching)
- **Heartache** (Attaching)

The brain in allostatic, **Reactive**, craving mode

# Craving Passing Away . . .

*With no presumed or felt deficit or disturbance of safety, satisfaction, and connection:*

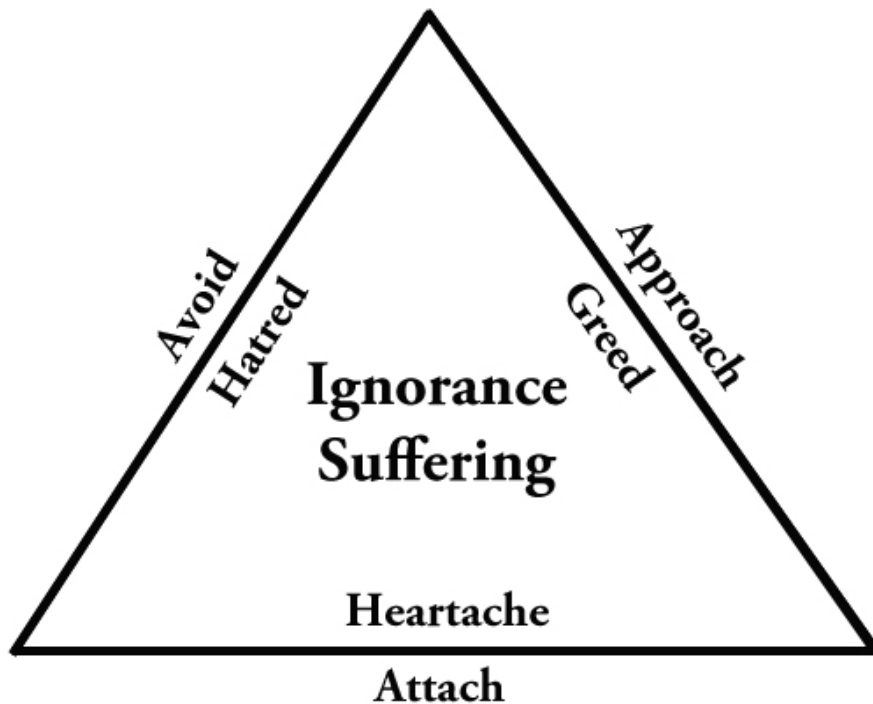
The body defaults to a sustainable equilibrium of refueling, repairing, and pleasant abiding.

The mind defaults to a sustainable equilibrium of:

- **Peace** (Avoiding)
- **Contentment** (Approaching)
- **Love** (Attaching)

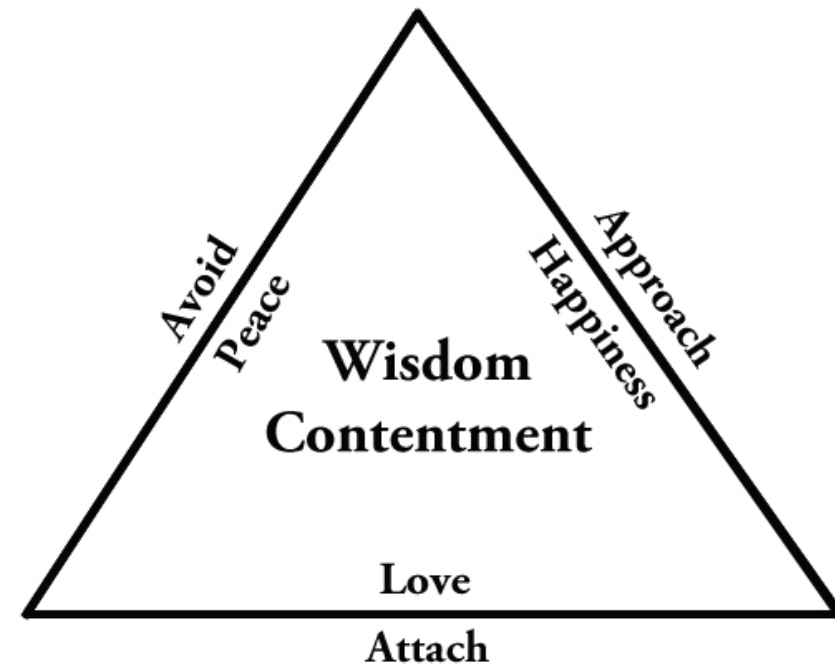
The brain in homeostatic, **Responsive**,  
minimal craving mode

# Choices . . .



**Reactive Mode**

Or?



**Responsive Mode**

*In Buddhism,  
we work to expand  
the range of life experiences  
in which we are free.*

**U Pandita**

# Can You Stay in the Green Zone When

---

**Things are unpleasant?**

**Things are pleasant?**

**Things are heartfelt?**

*With equanimity,  
you can deal with situations  
with calm and reason  
while keeping your inner happiness.*

**The Dalai Lama**

# Coming Home, Staying Home

---

**Positive experiences of core needs met - the felt sense of safety, satisfaction, and connection - activate Responsive mode.**

**Activated Responsive states can become installed Responsive traits. Responsive traits foster Responsive states.**

**Responsive states and traits enable us to stay Responsive with challenges.**

# **From the 2<sup>nd</sup> to the 3<sup>rd</sup> Noble Truth**



# Mental Resources for Challenges

---

**Safety** – Grit, protection, relaxation,  
feeling alright right now, peace

**Satisfaction** – Gratitude, gladness,  
accomplishment, contentment

**Connection** – Belonging, appreciation,  
friendship, compassion, love

# Pet the Lizard



# Feed the Mouse





# Hug the Monkey





**Peace**

**Contentment**

**Love**

# Cultivation Undoes Craving

---

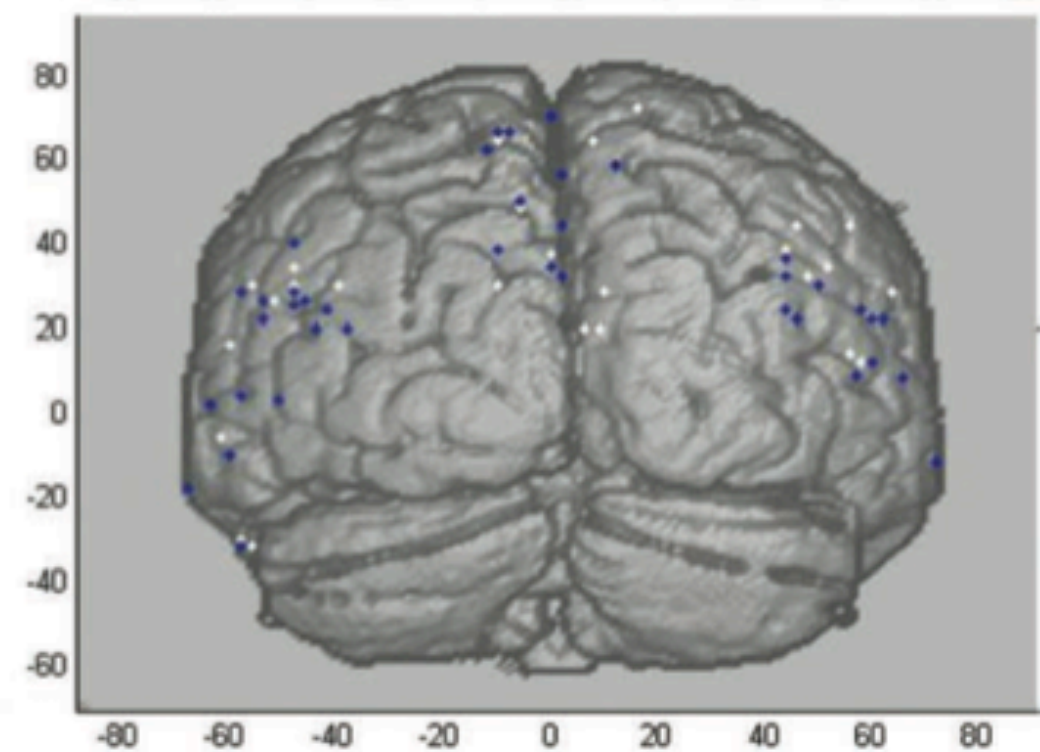
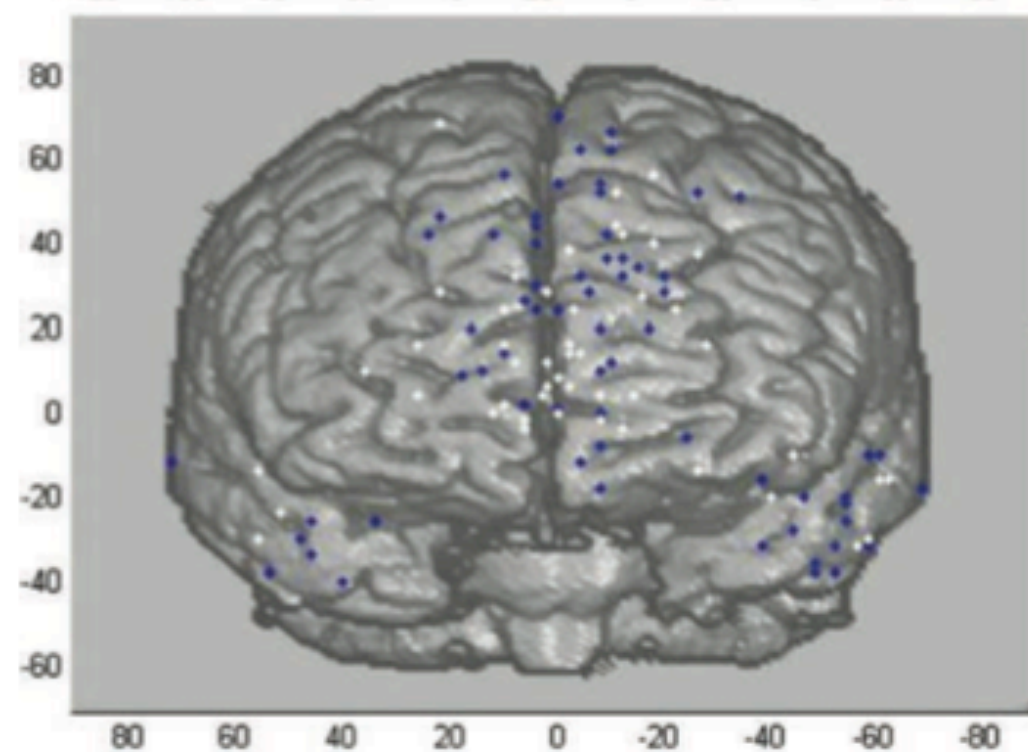
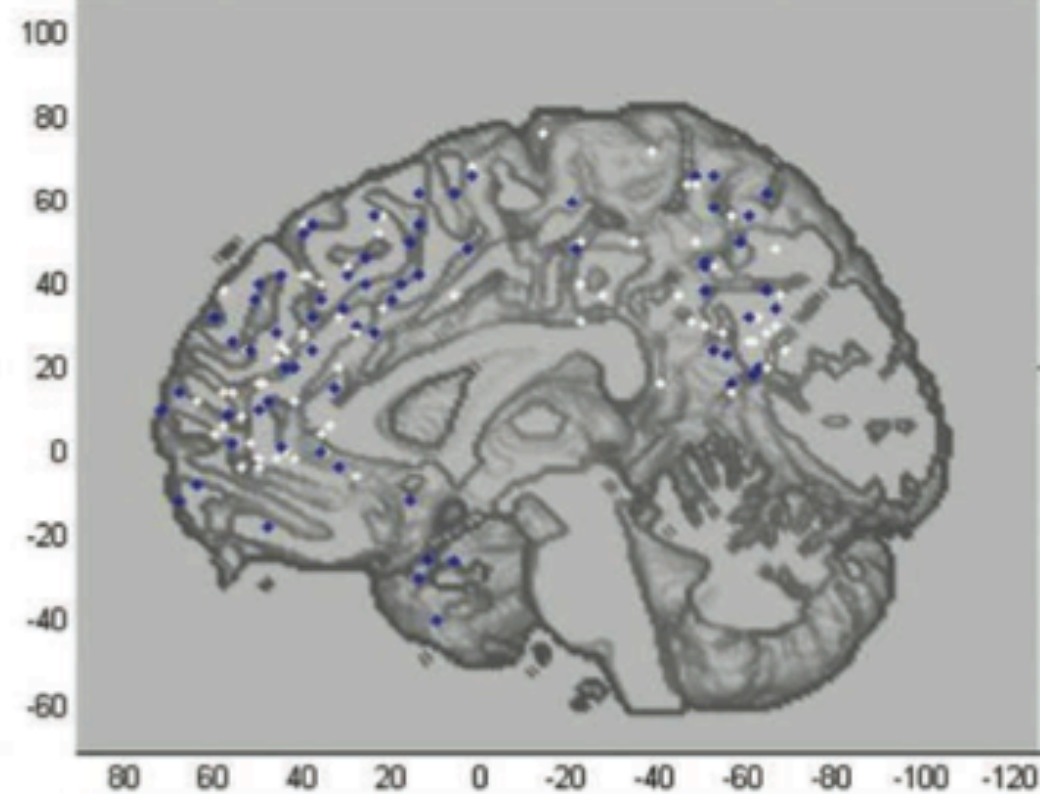
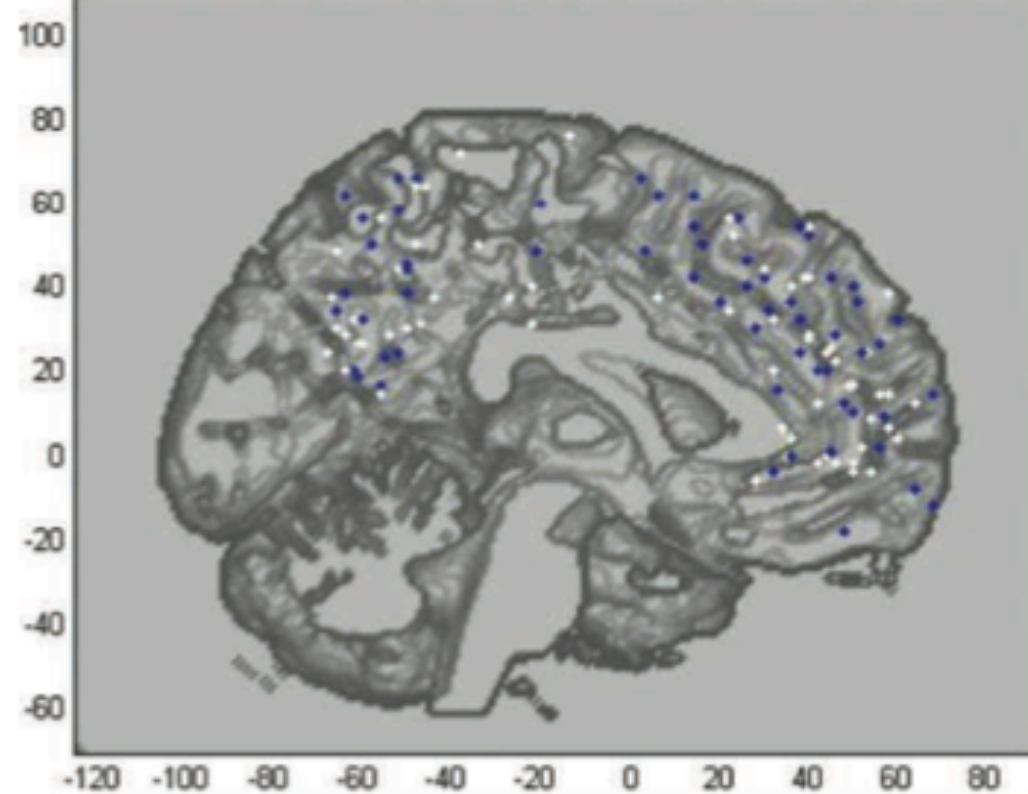
**We rest the mind upon beneficial states  
so that the brain may gradually take their shape.**

**This disentangles us from craving  
as we increasingly rest  
in a peace, contentment, and love  
that is independent of external conditions.**

**With time, even the practice of cultivation falls away –  
like a raft that is no longer needed  
once we reach the farther shore.**

# **Egocentric and Allocentric**





Logrand and Ruby, 2009. What is self specific? [White = self; blue = other]



# Self Is Like a Unicorn

- Self-related patterns of information and neural activity are as real as those that underlie the smell of roses.
- But that which they point to – a unified, enduring, independent “I” – just doesn’t exist.
- Just because there is a sense of self does not mean that there is a self. The brain strings together heterogeneous moments of self-ing and subjectivity into an illusion of homogenous coherence and continuity.
- Real representations in the brain of a horse point to something that is also real. But the real representations of a unicorn in the brain point to something that is not real.
- The real representations of the self in the brain point to another mythical creature: the apparent self<sup>73</sup>

# **“Bahiya, you should train yourself thus.”**

---

*In reference to the seen, there will be only the seen. To the heard, only the heard. To the sensed, only the sensed. To the cognized, only the cognized.*

*When for you there will be only the seen in reference to the seen, only the heard in the heard, only the sensed in the sensed, only the cognized in the cognized, then there's no you in that.*

*When there's no you in that, there's no you there. When there's no you there, you are neither here nor yonder nor between the two.*

*This, just this, is the end of all suffering.*

**The Buddha**

# Egocentric Perspective

---

- Based on upper processing streams in the brain that involve: upper portions of the thalamus that confer “self” salience; rear regions of the “default network” (e.g., precuneus, posterior cingulate cortex); parietal regions that construct an enduring and unified sense of “my body in space”
- Establishes “where it is in relation to me”; lower visual field
- Develops earliest in childhood
- “Subjective” - Things exist in relation to me.
- Action-oriented - Focus on reacting to carrots and sticks

# Allocentric Perspective

- Based on lower processing streams in the brain that involve: lower regions of the thalamus that confer “world” salience;
- Establishes “what it is independent of me”; upper visual field
- Begins developing around age four
- “Objective” - Things exist in a physical space in which their location is impersonal, not in reference to the viewpoint of an observer.
- This perspective pervades *kensho* and other forms of non-dual awareness. It is strengthened in open awareness meditations that draw heavily on the alerting, lower attentional system.
- Being-oriented

# The Egocentric/Allocentric Dance

---

- Normal egocentric/allocentric fluctuations occur ~ 3-4 times a minute.
- As one perspective increases, the other decreases.
- With “contact,” allocentric processing increases briefly as the new stimulus is considered in its own right
- Then egocentric processing surges forward as one figures out what to do about the “feeling tone” (pleasant, unpleasant, neutral, heartfelt) of the stimulus.

# Strengthening Allocentric Processing – 1

- Taking in experiences of the allocentric mode – regarding reality impersonally, panoramic perspective, little sense of “I,” feeling connected – will naturally strengthen its neural substrates.
- Open awareness practices in which there are many moments of new contact would strengthen the “alerting” networks of attention and incline the brain toward allocentric mode.
- Lower regions of the thalamus – with concentrations of GABA neurons – inhibit egocentric processing. GABA is calming; training in tranquility could strengthen these GABA-based nodes and reduce egocentrism.

# Strengthening Allocentric Processing – 2

---

- “Craving” causes egocentric processing (and suffering). Craving itself is caused by a sense of deficit or disturbance in core needs: safety, satisfaction, connection. So repeatedly internalizing the experience of needs being met builds up a sense of fullness and balance, reducing underlying causes of craving and thus egocentric processing.
- We can relate to our mind from an egocentric or allocentric perspective. Suffering comes from parts tussling with other parts within an egocentric frame. So abide as mind as a whole.

# Strengthening Allocentric Processing – 3

---

- Each moment of mind depends on a vast network of causes: the body, nature, human culture, and material reality . . . stretching back through human history, the evolution of life, and w-a-y back to the Big Bang.

This moment of experience is the local expression of this allness – like a small ripple contains within itself something of the whole ocean.

The felt recognition of mind depending upon this allness, being an expression of it, is the epitome of allocentric mode.



---

**Coming into presence in this moment, continually  
letting go**

**Opening into a growing sense of peace . . .  
contentment . . . love . . .**

**Disengaging from parts, abiding as mind as a whole**

**Recognizing mind as a local rippling of a vast sea of  
causes, opening into being the sea of allness**

*To study the Way is to study the self.*

*To study the self is to forget the self.*

*To forget the self is  
To be enlightened by all things.*

Dogen

# **Some Larger Implications**

# Societal Implications of Positive Neuroplasticity

- For most of the time our human and hominid ancestors have lived, it was not possible to meet the core needs of everyone. But now the resources and know-how exist to do this. How we handle this unprecedented opportunity will be the central theme of this century.
- Improving external conditions is vital – but not enough. Many affluent people dwell in anxiety and anger, frustration and drivenness, and hurt and ill will.
- Repeatedly internalizing Responsive experiences develop a “green brain” that is harder to manipulate with threats and fear, greed and consumerism, and “us” vs. “them” rivalries. A critical mass of “green brains” will bring a tipping point that changes the course of human history.

# A Fifth Yana?

---

The “Buddhastream” developed through four major vehicles (*yanas*): Theravadan, Tibetan, Chan/Zen, and Pure Land.

Could we be helping develop an emergent Fifth Yana, with:

- Many householders engaging deep contemplative practice
- Multiculturalism as both a reality and a value
- Access to and eclectic use of the full array of Buddhist teachings
- Flattening hierarchies
- Naturalizing dharma practice; using science and psychology
- Skillful use of positive experiences; “Western tantra”
- Deconstructing and applying Buddhist practices in non-Buddhist settings (e.g., pain-control clinics, schools, psychotherapy)

*The root of Buddhism is compassion, and  
the root of compassion  
is compassion for oneself.*

**Pema Chodron**

# “Anthem”

---

*Ring the bells that still can ring  
Forget your perfect offering  
There is a crack in everything  
That's how the light gets in  
That's how the light gets in*

Leonard Cohen

# Suggested Books

---

See [www.RickHanson.net](http://www.RickHanson.net) for other great books.

- Austin, J. 2009. *Selfless Insight*. MIT Press.
- Begley, S. 2007. *Train Your Mind, Change Your Brain*. Ballantine.
- Carter, C. 2010. *Raising Happiness*. Ballantine.
- Hanson, R. (with R. Mendius). 2009. *Buddha's Brain: The Practical Neuroscience of Happiness, Love, and Wisdom*. New Harbinger.
- Johnson, S. 2005. *Mind Wide Open*. Scribner.
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- Kornfield, J. 2009. *The Wise Heart*. Bantam.
- LeDoux, J. 2003. *Synaptic Self*. Penguin.
- Linden, D. 2008. *The Accidental Mind*. Belknap.
- Sapolsky, R. 2004. *Why Zebras Don't Get Ulcers*. Holt.
- Siegel, D. 2007. *The Mindful Brain*. Norton.
- Thompson, E. 2007. *Mind in Life*. Belknap.



# Key Papers - 1

See [www.RickHanson.net](http://www.RickHanson.net) for other scientific papers.

- Atmanspacher, H. & Graben, P. 2007. Contextual emergence of mental states from neurodynamics. *Chaos & Complexity Letters*, 2:151-168.
- Baumeister, R., Bratlavsky, E., Finkenauer, C. & Vohs, K. 2001. Bad is stronger than good. *Review of General Psychology*, 5:323-370.
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# Key Papers - 2

- Davidson, R.J. 2004. Well-being and affective style: neural substrates and biobehavioural correlates. *Philosophical Transactions of the Royal Society*, 359:1395-1411.
- Farb, N.A.S., Segal, Z.V., Mayberg, H., Bean, J., McKeon, D., Fatima, Z., and Anderson, A.K. 2007. Attending to the present: Mindfulness meditation reveals distinct neural modes of self-reflection. *SCAN*, 2, 313-322.
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- Hanson, R. 2008. Seven facts about the brain that incline the mind to joy. In *Measuring the immeasurable: The scientific case for spirituality*. Sounds True.

# Key Papers - 3

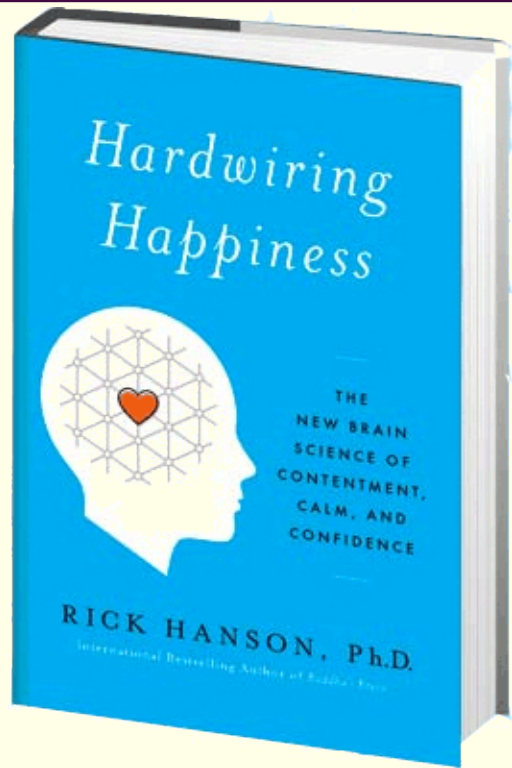
- Lazar, S., Kerr, C., Wasserman, R., Gray, J., Greve, D., Treadway, M., McGarvey, M., Quinn, B., Dusek, J., Benson, H., Rauch, S., Moore, C., & Fischl, B. 2005. Meditation experience is associated with increased cortical thickness. *Neuroreport*, 16:1893-1897.
- Lewis, M.D. & Todd, R.M. 2007. The self-regulating brain: Cortical-subcortical feedback and the development of intelligent action. *Cognitive Development*, 22:406-430.
- Lieberman, M.D. & Eisenberger, N.I. 2009. Pains and pleasures of social life. *Science*, 323:890-891.
- Lutz, A., Greischar, L., Rawlings, N., Ricard, M. and Davidson, R. 2004. Long-term meditators self-induce high-amplitude gamma synchrony during mental practice. *PNAS*, 101:16369-16373.
- Lutz, A., Slager, H.A., Dunne, J.D., & Davidson, R. J. 2008. Attention regulation and monitoring in meditation. *Trends in Cognitive Sciences*, 12:163-169.

# Key Papers - 4

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